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(54) **SYSTEM AND METHOD FOR CONFIGURING A THERMAL IMAGING INSTRUMENT**

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G06F 3/0484 (2013.01)

(52) **U.S. Cl.**
CPC ***G01J 5/00*** (2013.01); ***G06F 3/04847*** (2013.01)

(58) **Field of Classification Search**
CPC G01J 2005/0048; G01J 2005/0085; G01J 5/0022; G01J 5/08; F24F 2011/0013; F24F 2011/0091
USPC 715/833; 250/339.04; 374/124
See application file for complete search history.

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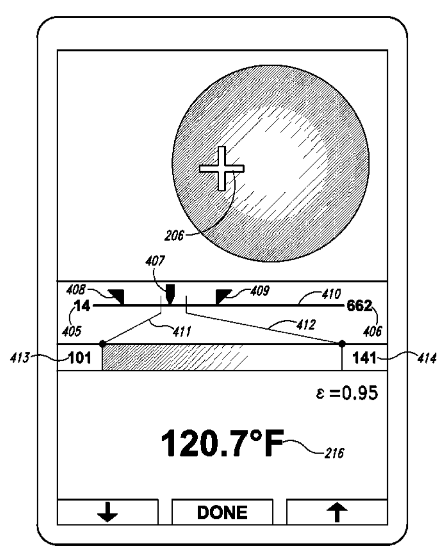
(57) **ABSTRACT**

A graphical user interface for configuring parameters associated with a portable infrared imager is provided. The interface can be used to manually or automatically set range and span parameters. The interface can also be used to configure one or more alarms to notify a user that a detected temperature is outside a predetermined range.

25 Claims, 16 Drawing Sheets



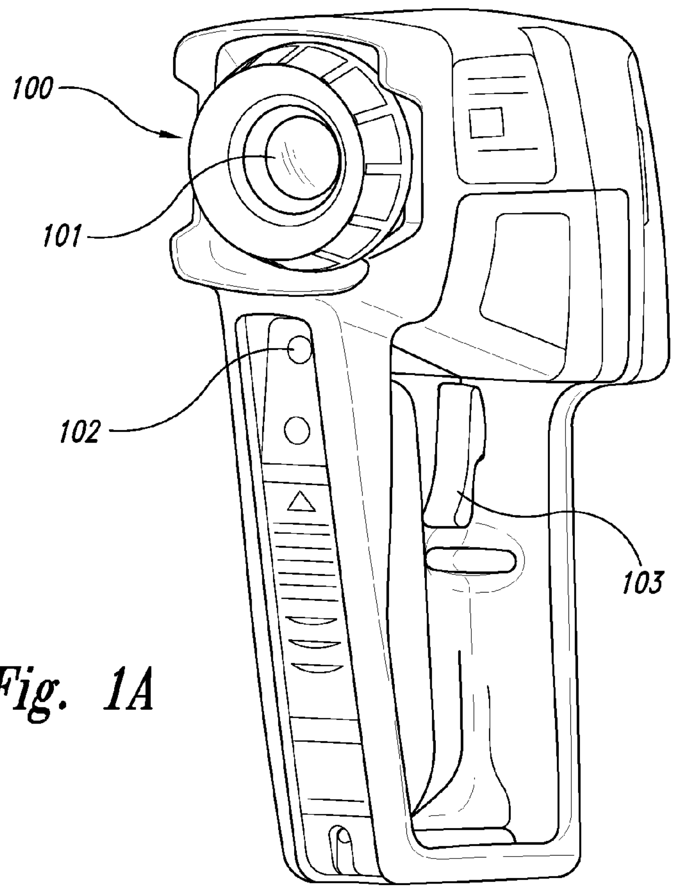


Fig. 1A

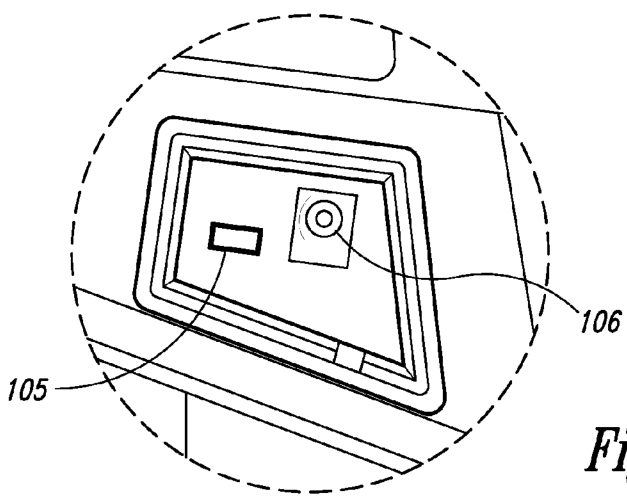


Fig. 1B

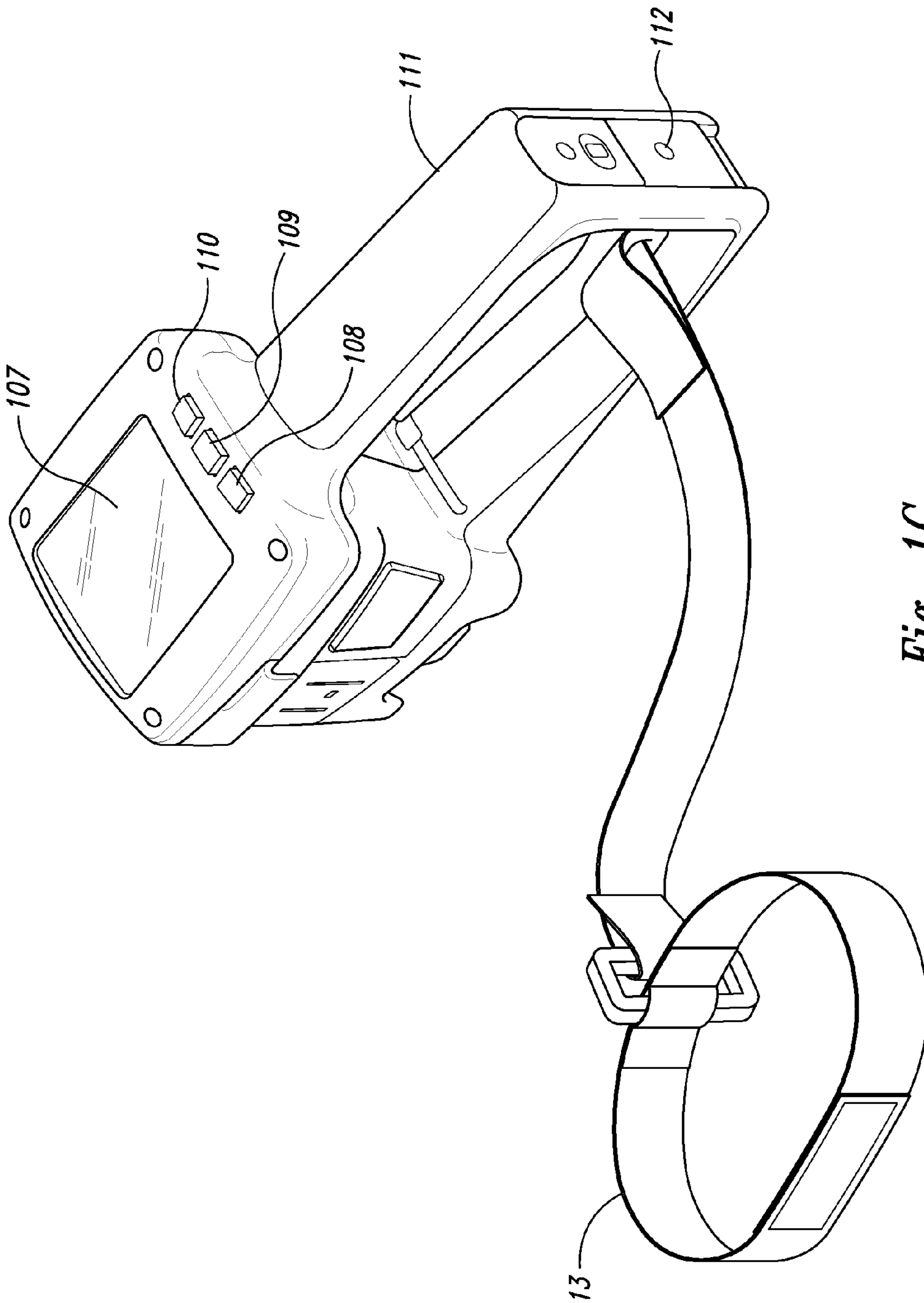


Fig. 1C

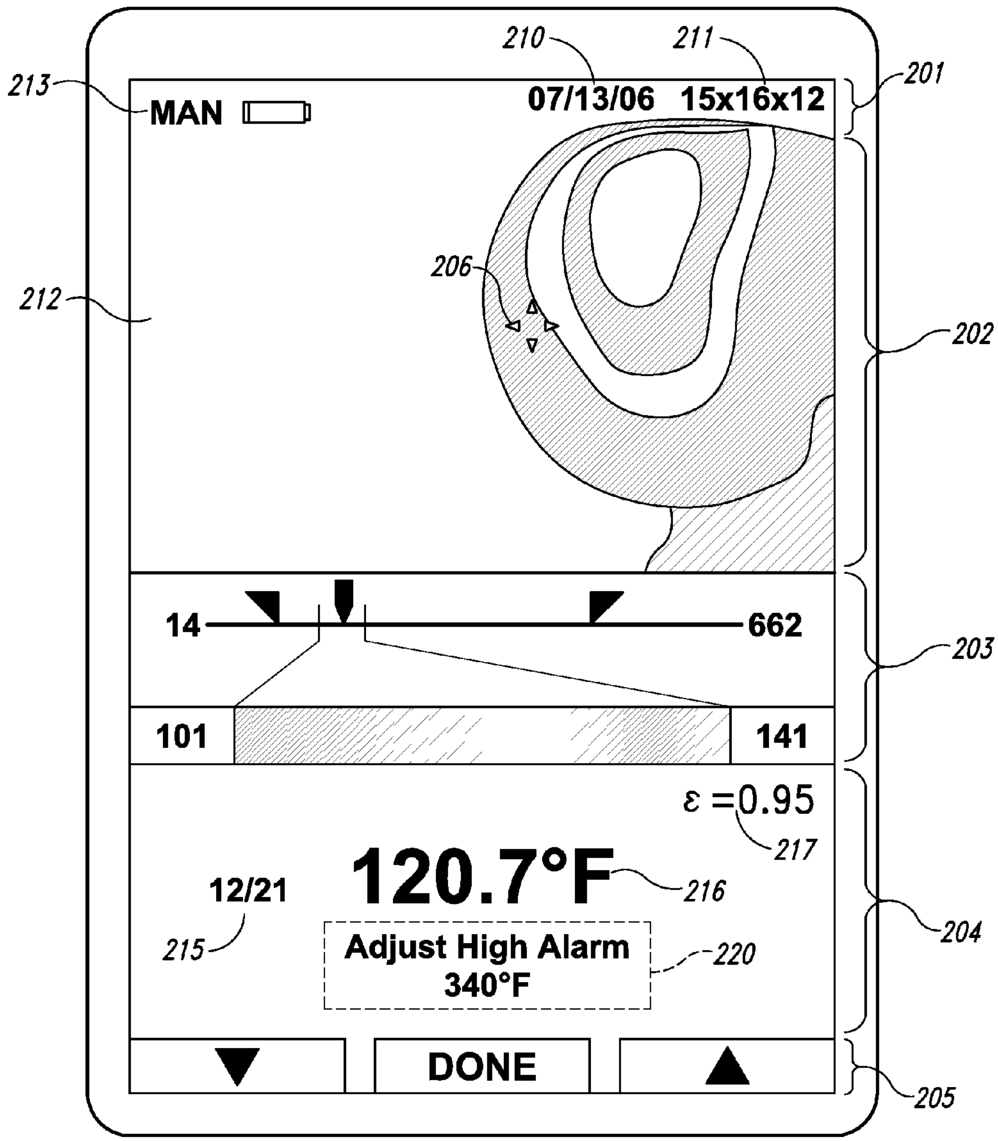

210
211
213
MAN
07/13/06 15x16x12
201
206
212
202
14
662
203
101
141
ε =0.95
217
12/21
120.7°F
216
204
215
Adjust High Alarm
340°F
220
DONE
205

Fig. 2

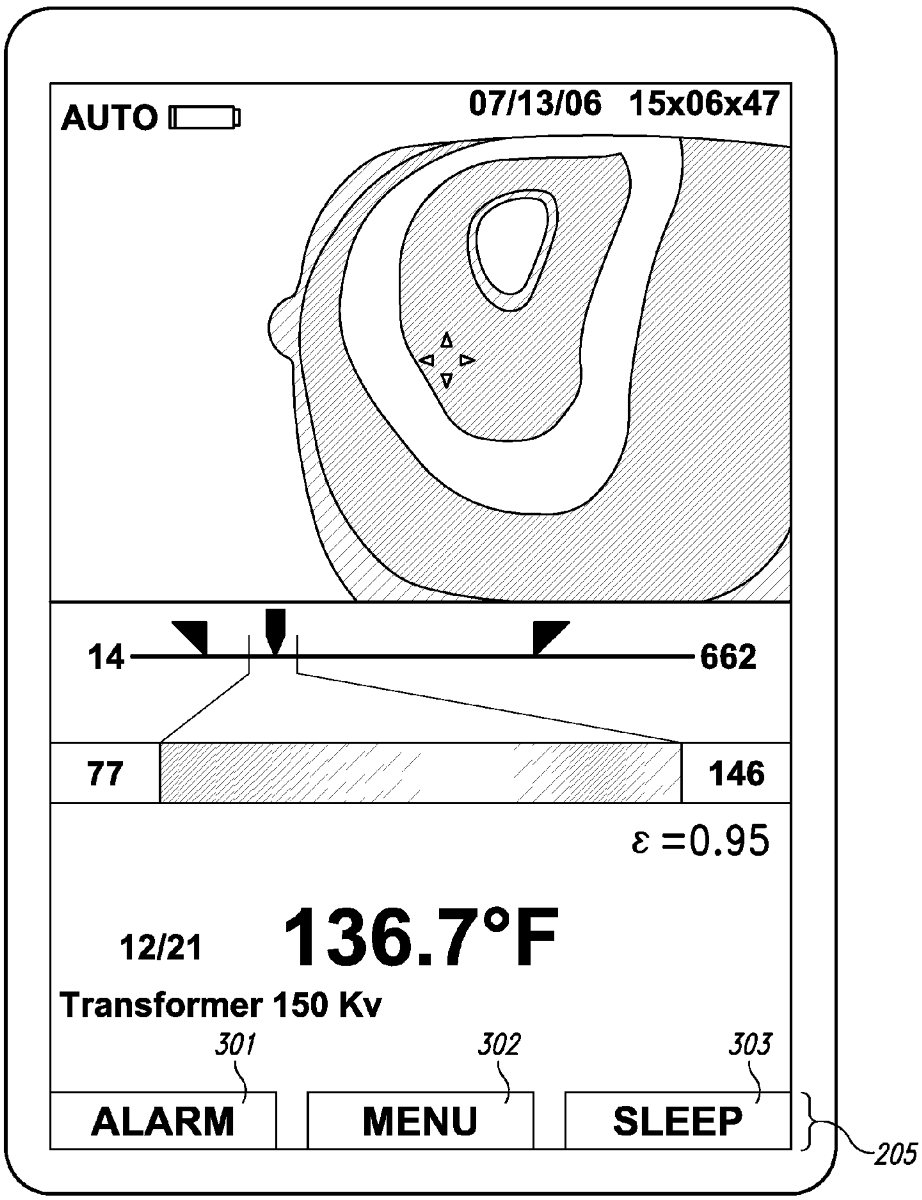

AUTO
07/13/06 15x06x47
14
662
77
146
ε =0.95
12/21
136.7°F
Transformer 150 Kv
301
302
303
ALARM
MENU
SLEEP
205

Fig. 3

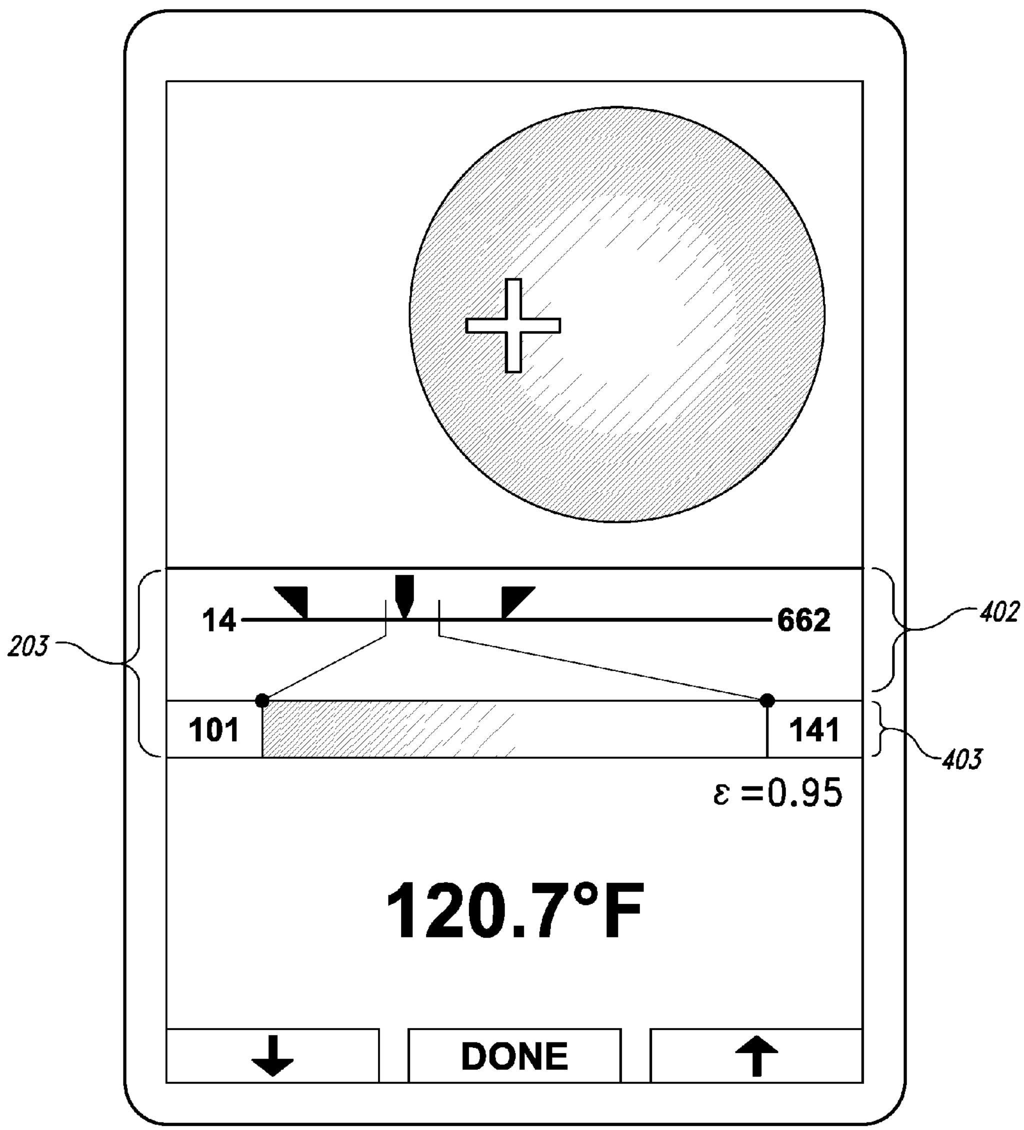


Fig. 4A

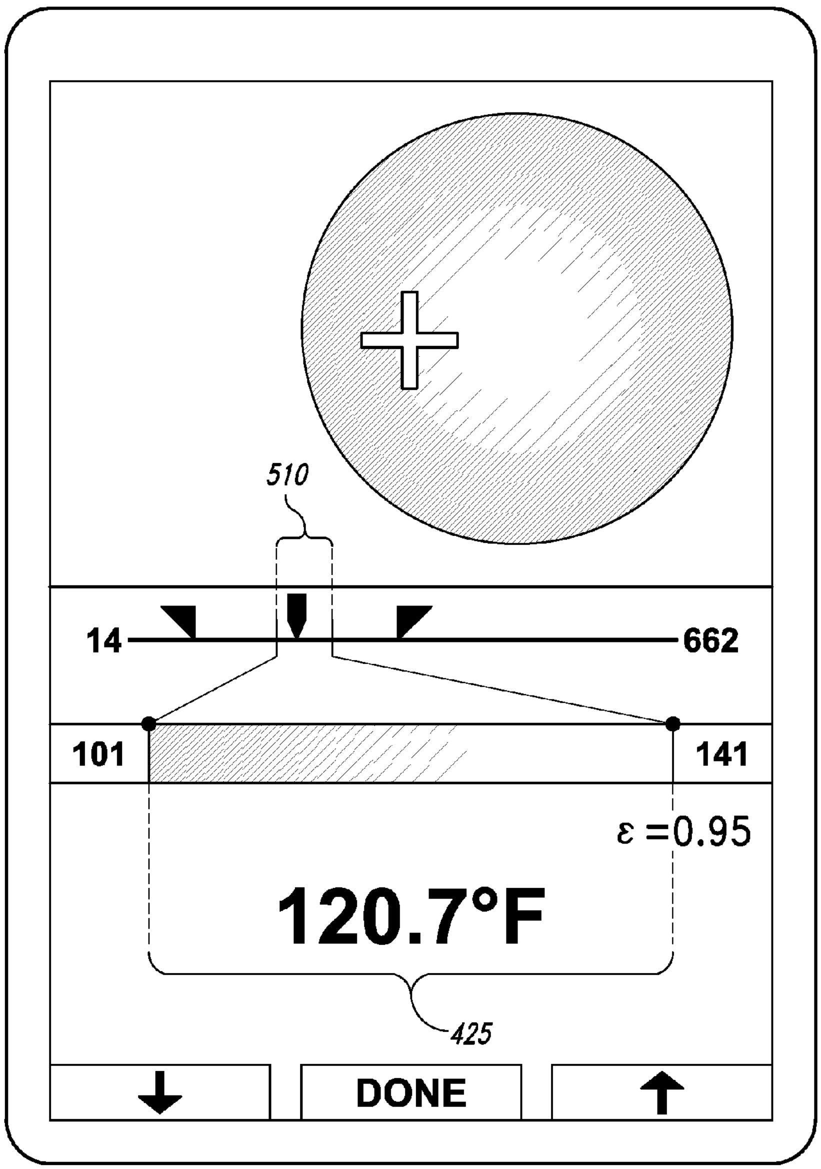


Fig. 4B

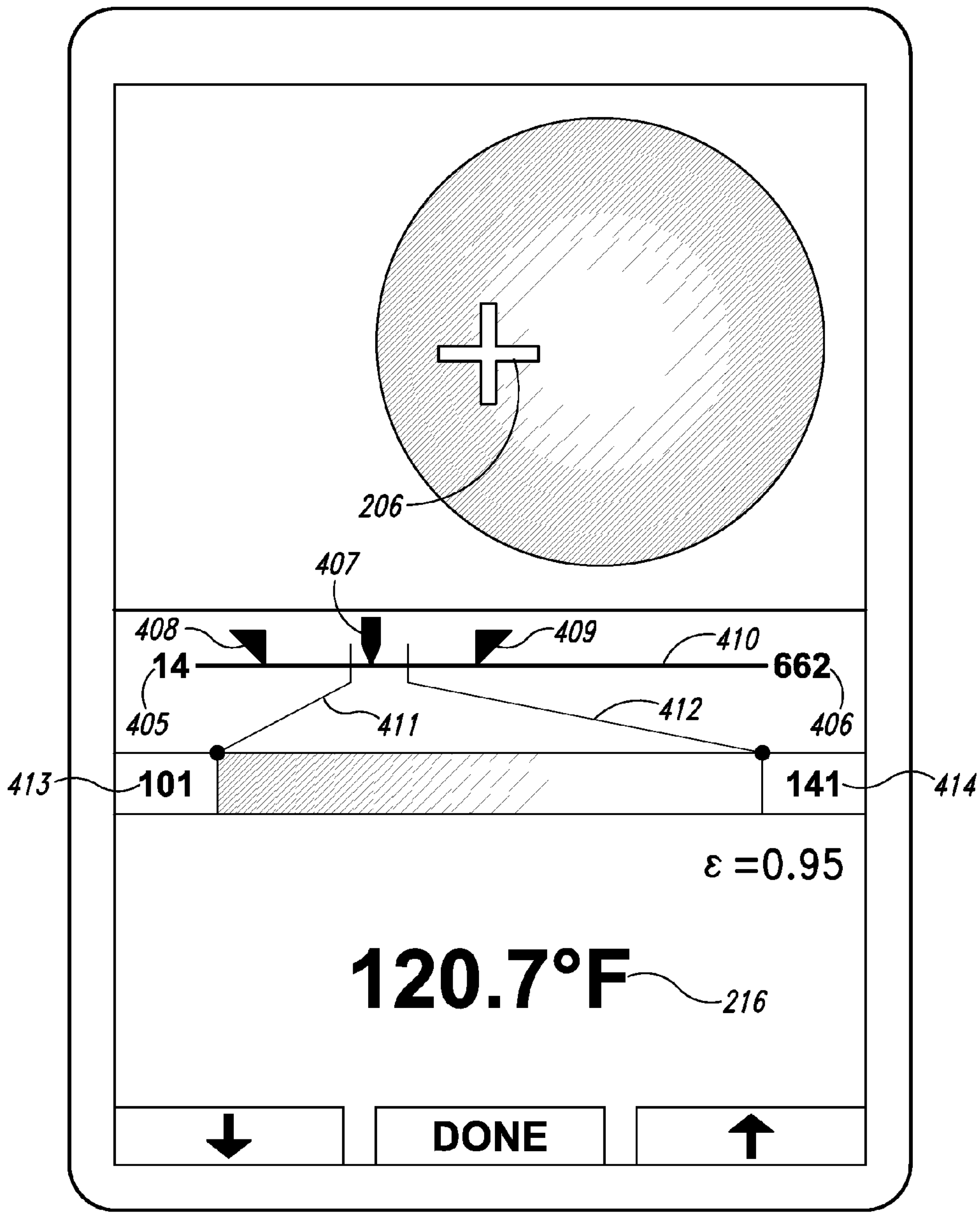

206
407
408
409
410
14
662
405
406
411
412
413
101
141
414
ε =0.95
120.7°F
216
DONE

Fig. 4C

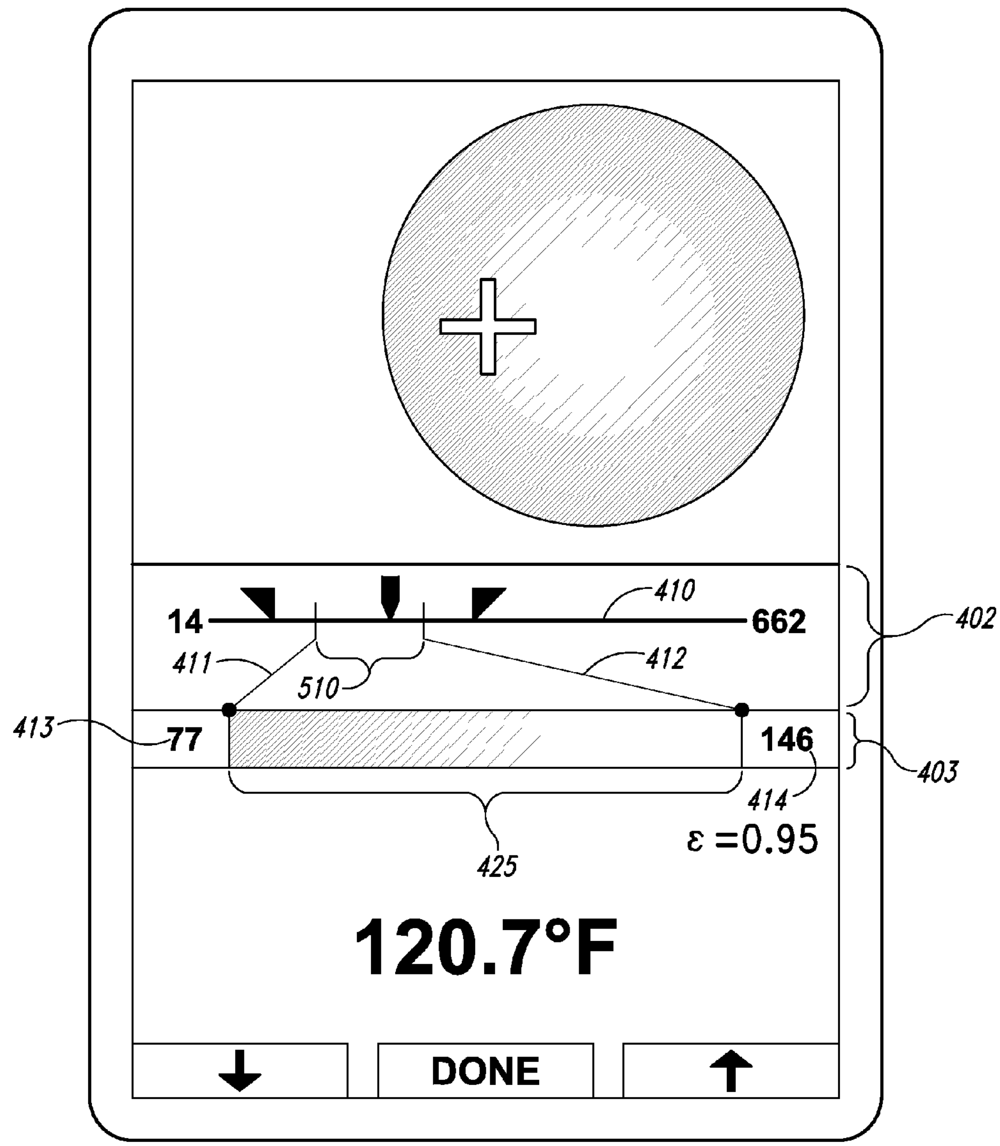

410
14
662
402
411
412
510
413
77
146
403
414
425
ε =0.95
120.7°F
DONE

Fig. 5

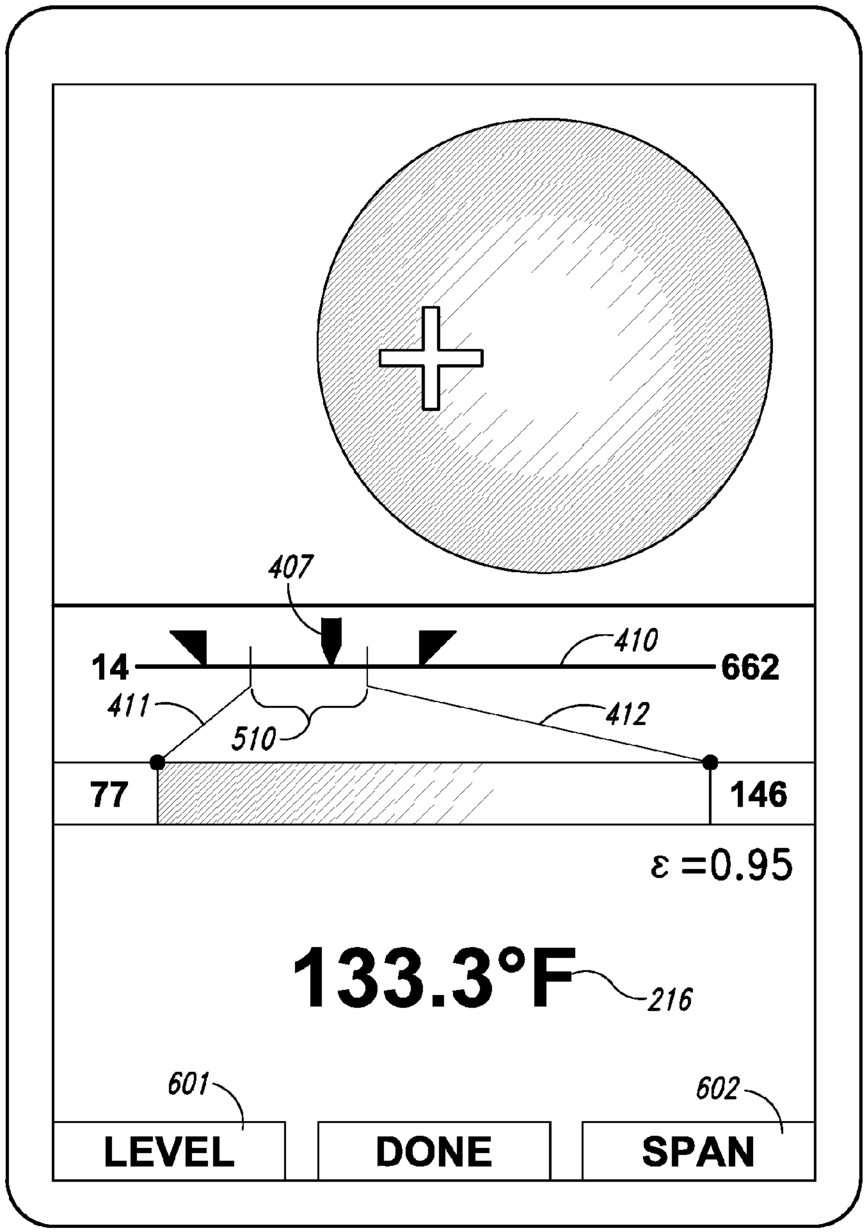

407
14
410
662
411
412
510
77
146
ε =0.95
133.3°F
216
601
602
LEVEL
DONE
SPAN

Fig. 6

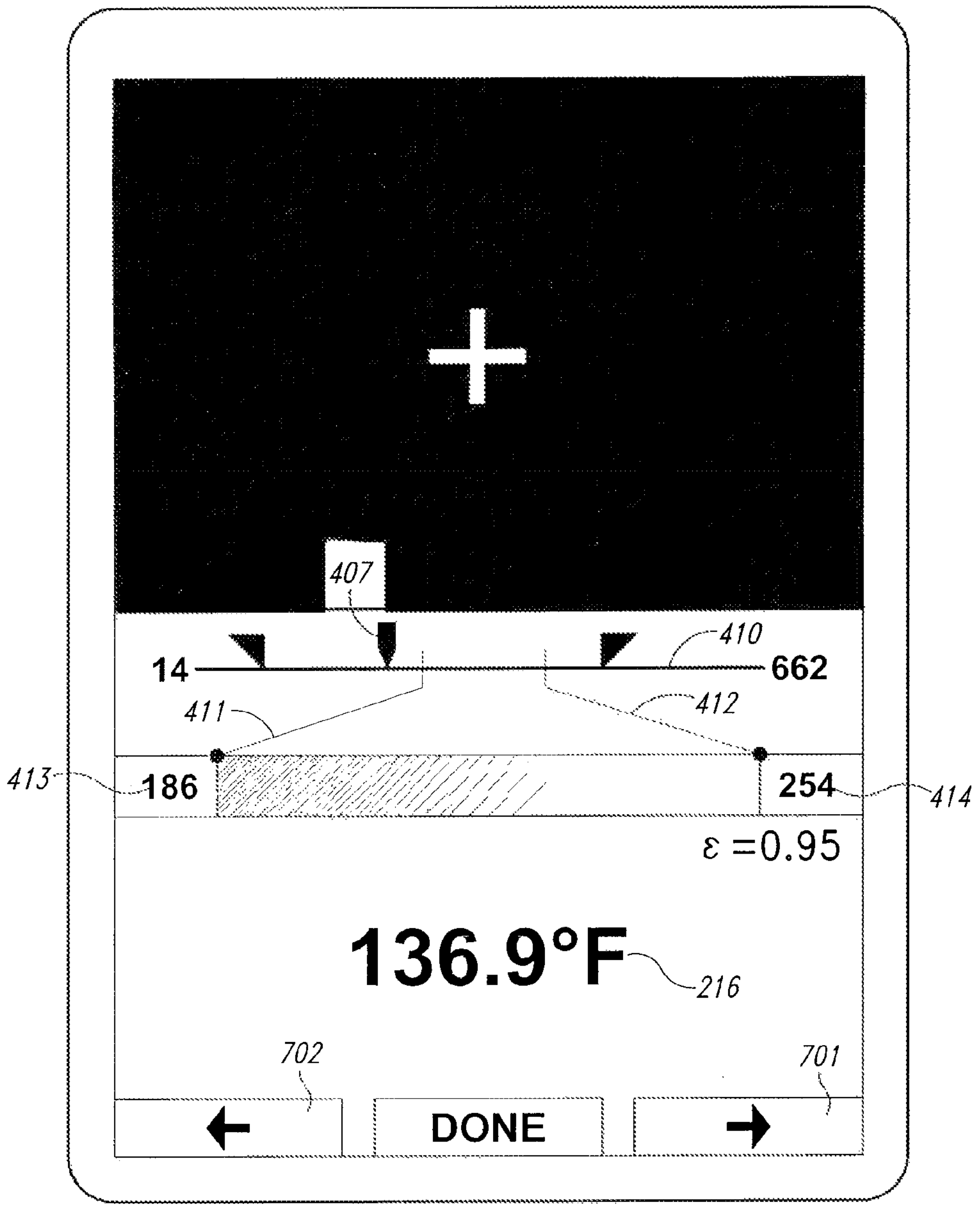

407
410
14
662
411
412
413
186
254
414
ε =0.95
136.9°F
216
702
701
DONE

Fig. 7

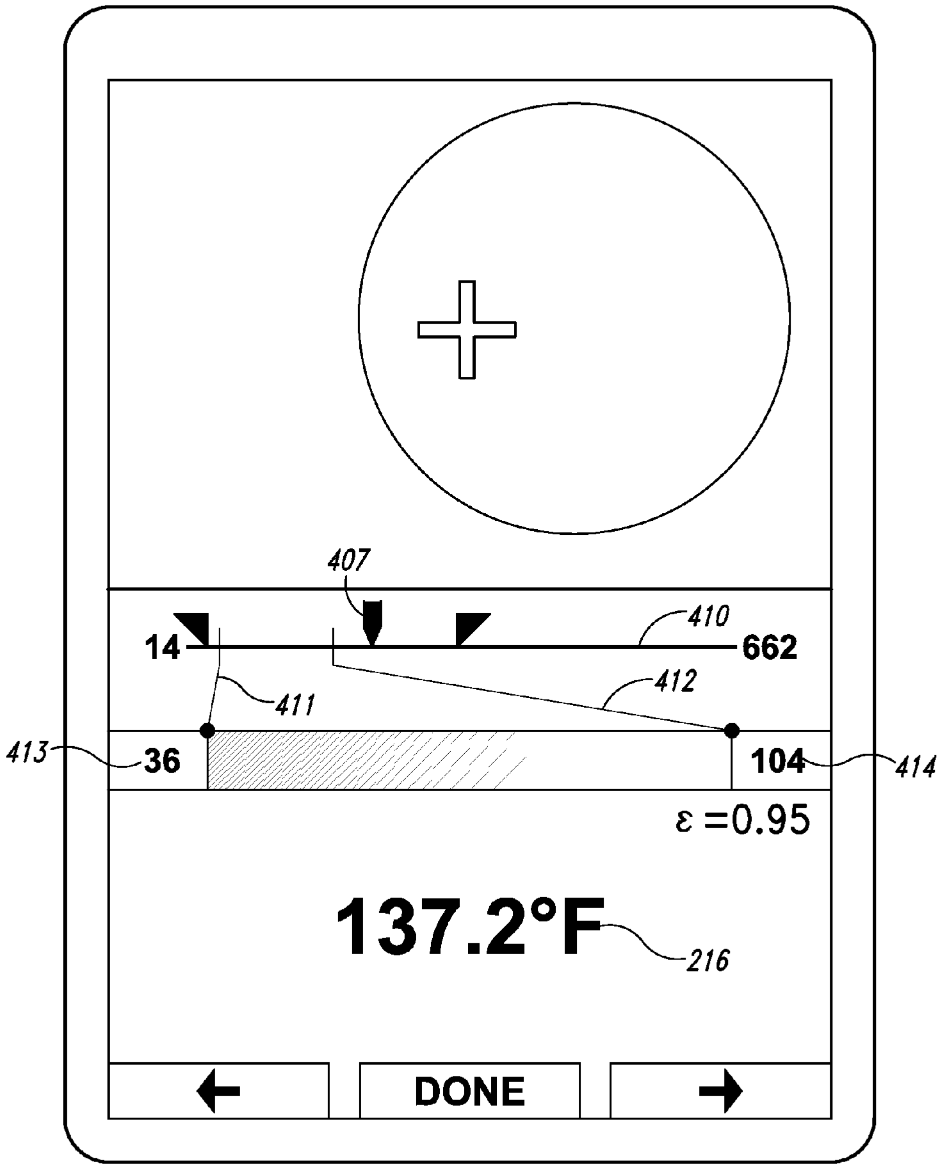


Fig. 8

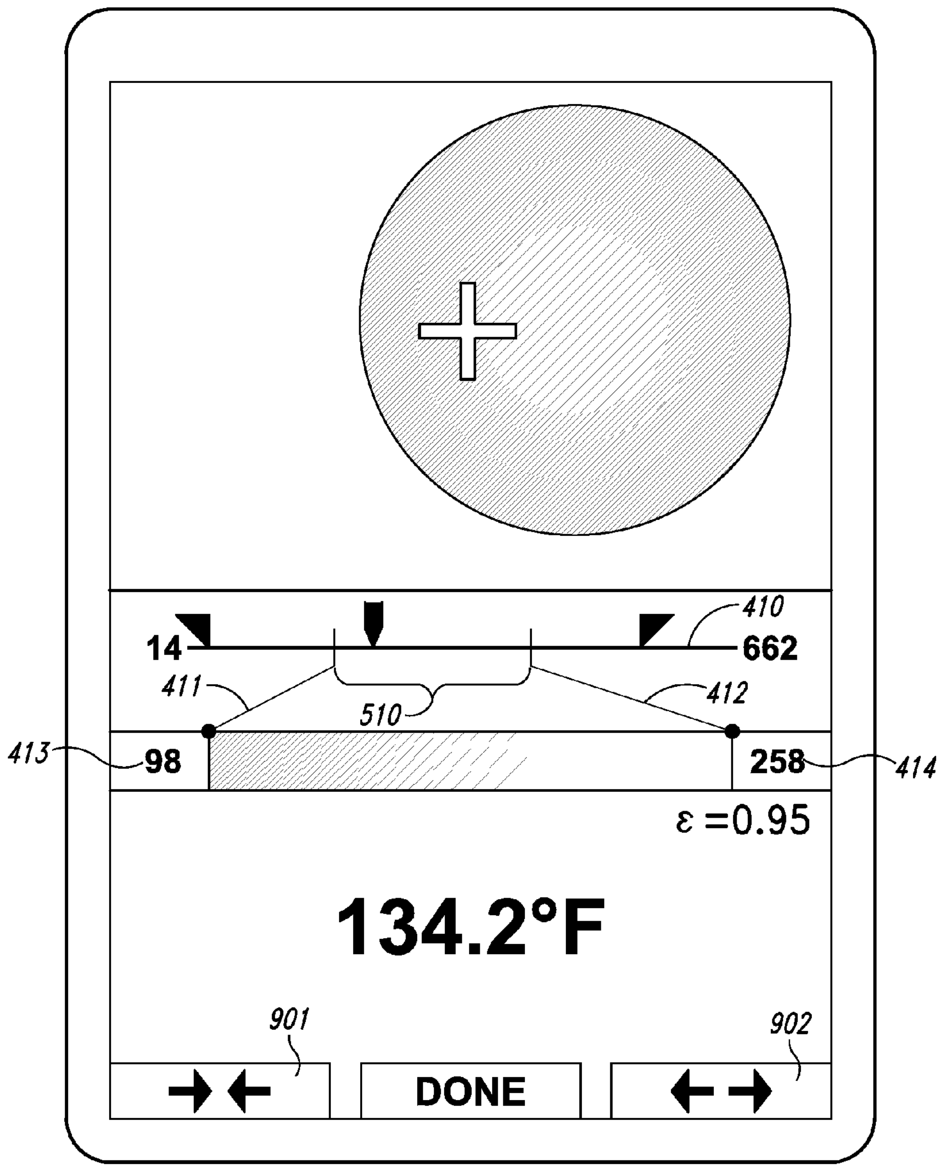


Fig. 9

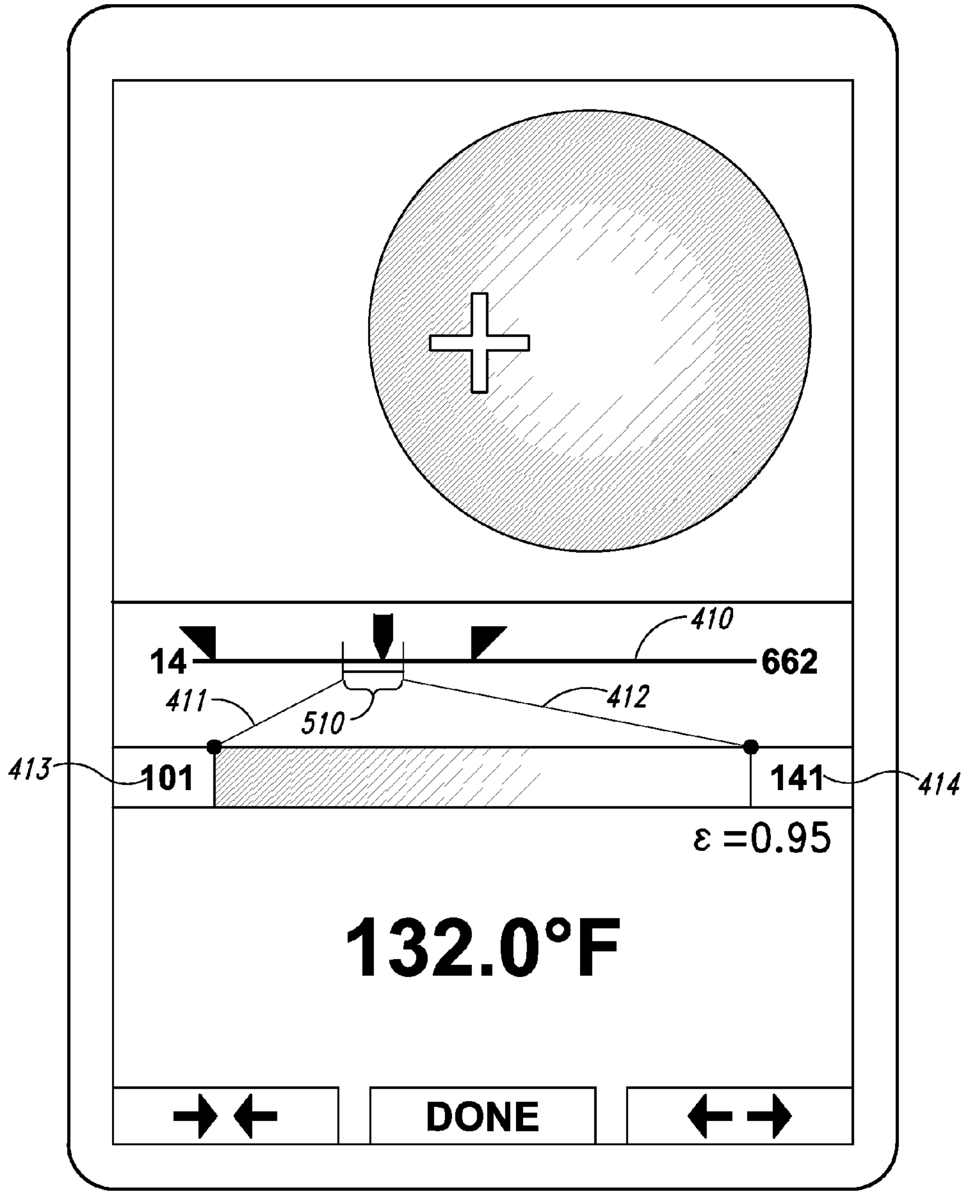


Fig. 10

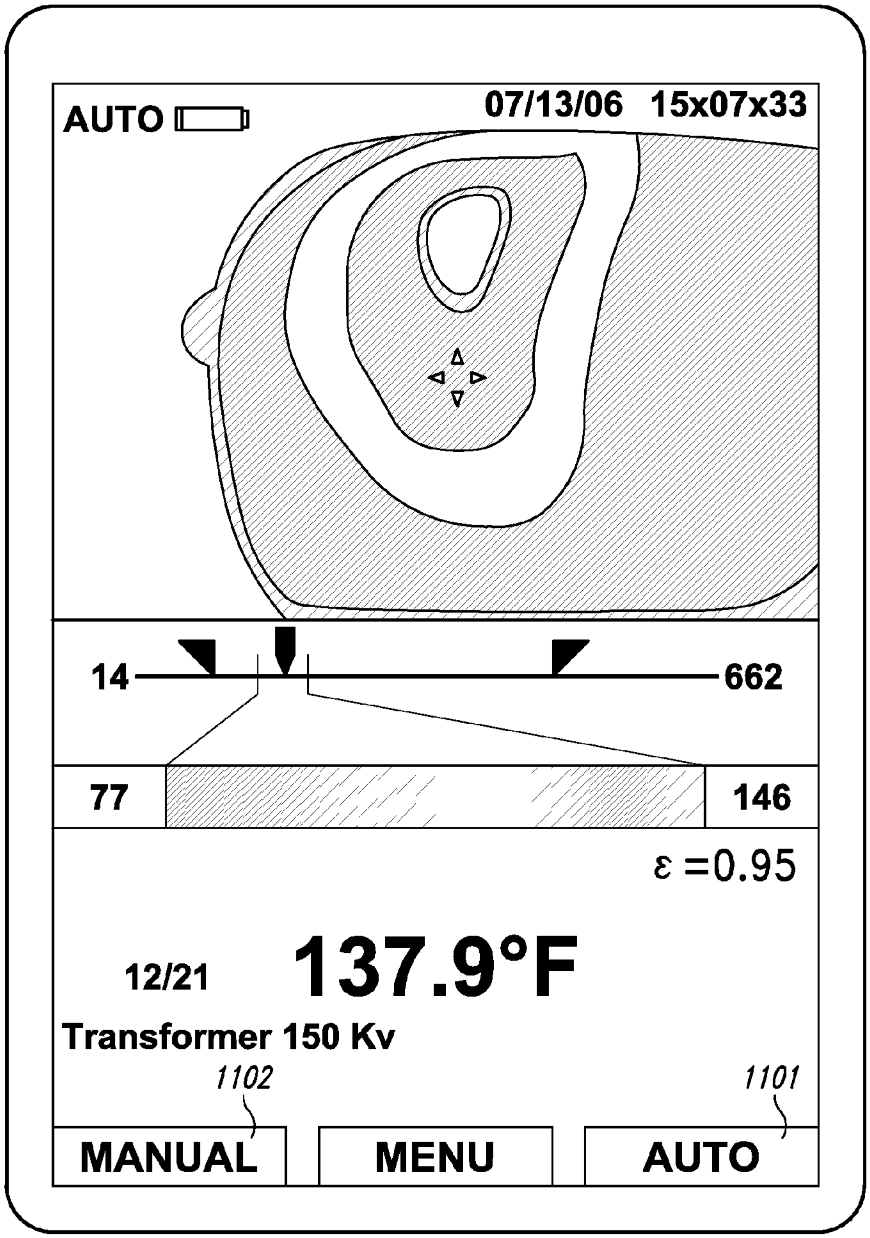

AUTO
07/13/06 15x07x33
14
662
77
146
ε =0.95
12/21
137.9°F
Transformer 150 Kv
1102
1101
MANUAL
MENU
AUTO

Fig. 11

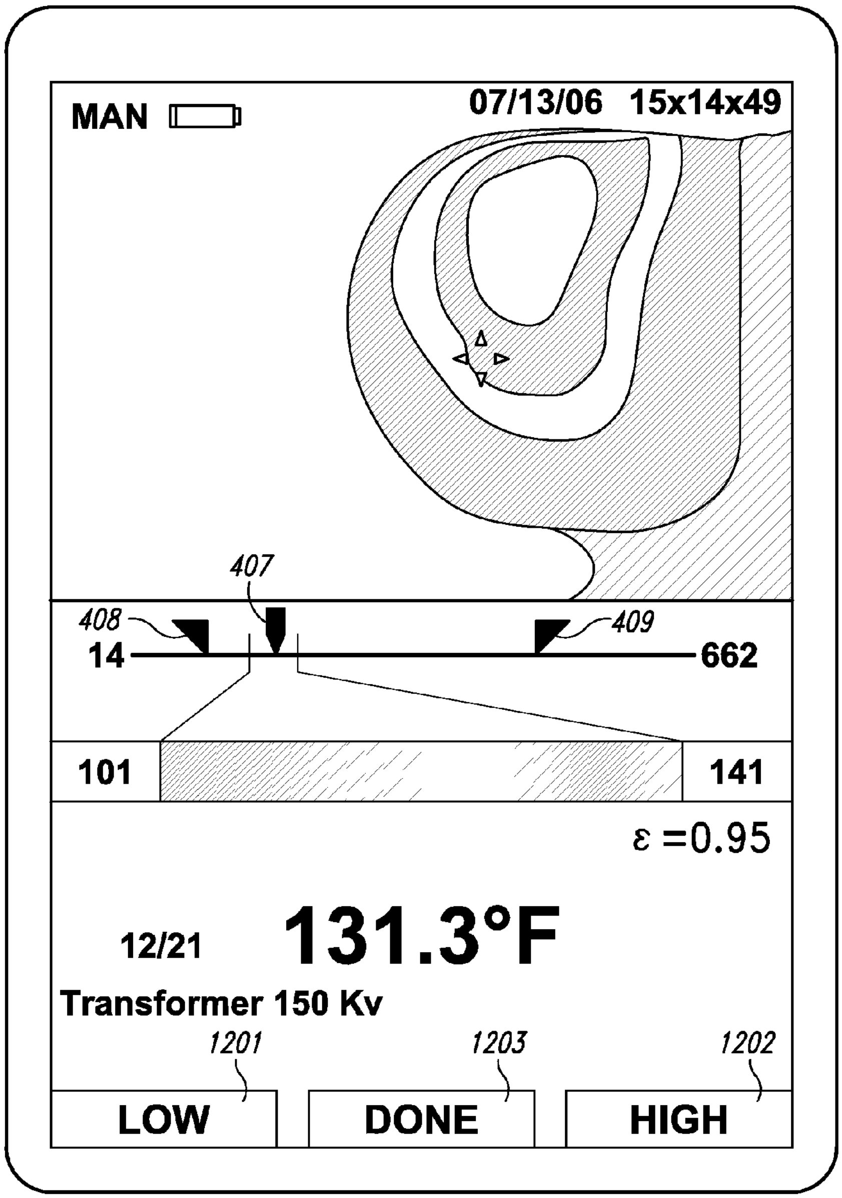

MAN
07/13/06 15x14x49
407
408
409
14
662
101
141
ε =0.95
12/21
131.3°F
Transformer 150 Kv
1201
1203
1202
LOW
DONE
HIGH

Fig. 12

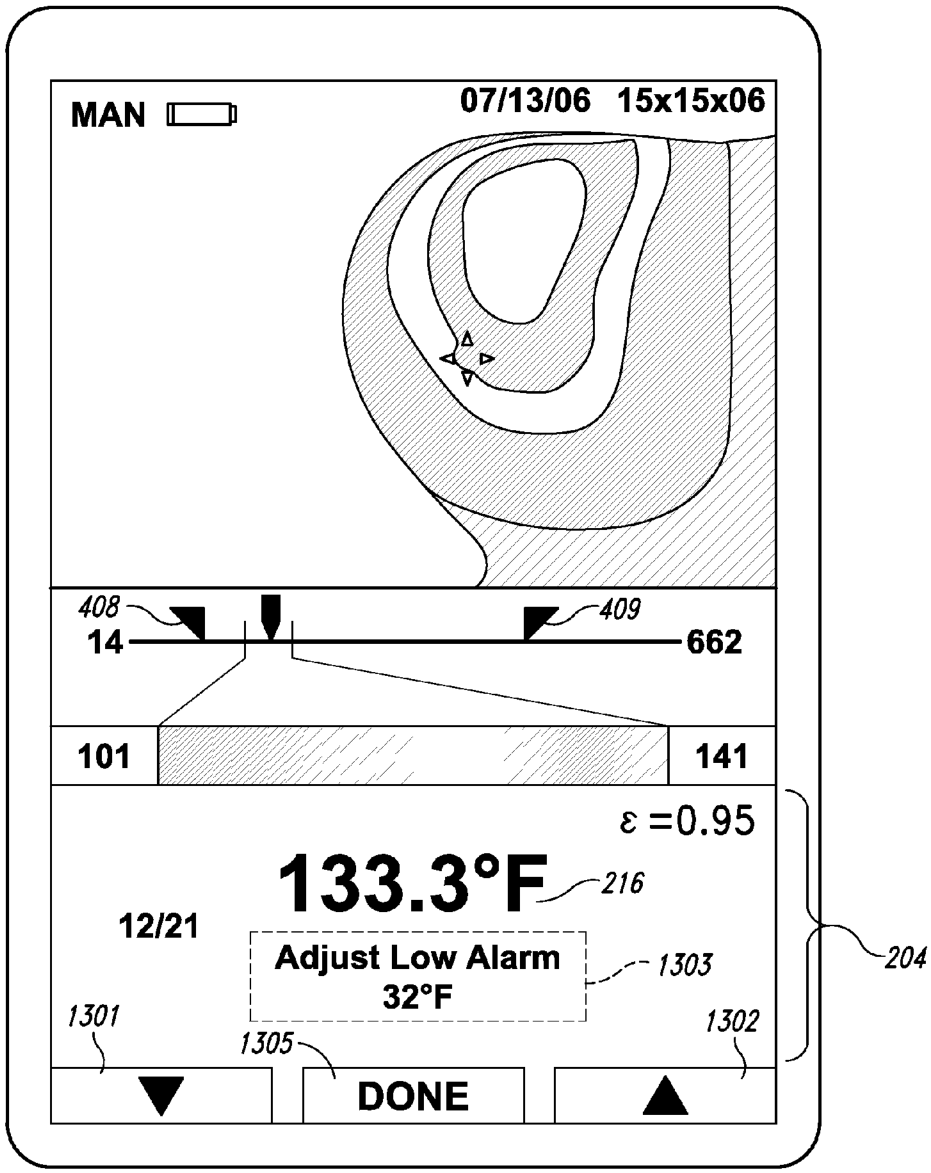

MAN
07/13/06 15x15x06
408
409
14
662
101
141
ε =0.95
133.3°F
216
12/21
Adjust Low Alarm
32°F
1303
204
1301
1302
1305
DONE

Fig. 13

SYSTEM AND METHOD FOR CONFIGURING A THERMAL IMAGING INSTRUMENT

TECHNICAL FIELD

The following is related to a graphical user interface for configuring an infrared thermal imaging instrument, and more particularly, to an interface for defining and viewing display parameters.

BACKGROUND

Infrared thermal imaging instruments commonly are used for obtaining temperature profiles of objects such as industrial machines or components of operating equipment. Inspecting an object's operating temperature conditions can reveal whether a failure is imminent or a machinery adjustment is necessary.

Thermal imaging instruments are necessary because the human eye cannot perceive temperature directly. Thermographic imaging systems operate by mapping detected temperatures to the spectrum of visible light. A relatively cold temperature may be displayed as a black or blue color while a relatively hot temperature may be displayed as a red or white color. Given the large number of discrete temperatures an imager can detect and the relatively small number of colors that can be displayed on a typical screen and appreciated by the human eye, it is not practical to map every detectable temperature to a unique color. Instead, it is desirable to map only a subset of the detectable temperatures to the displayed color range.

Known thermal imagers map a large range of detectable temperatures to a smaller color range and some known thermal imagers provide user configuration options. Typically, however, such systems are unintuitive and difficult to use. Furthermore, while these systems may present the user with various configuration options, no intuitive or graphical indication is provided to assist the user in successfully configuring or understanding the display.

SUMMARY

A method for displaying a configuration of a portable imaging device and a graphical user interface for a portable imaging device are disclosed. In one embodiment, the method for displaying a configuration of a portable imaging device can include displaying a device range bar representing a range of temperatures, wherein one end of the range bar corresponds to a low temperature detectable by the device and the other end corresponds to a high temperature detectable by the device, and wherein the device range bar is displayed within a device range bar area, displaying an image range bar having a color gradient corresponding to a subrange of the temperatures, and indicating the subrange of temperatures represented by the image range bar within the device range bar area, wherein a thermal image displayed on the portable imaging device uses colors from the color gradient that correspond to a temperature gradient for an image scene.

In another embodiment, the graphical user interface for a portable imaging device can include a device range bar representing a range of temperatures, wherein one end of the range bar corresponds to a low temperature detectable by the device and the other end corresponds to a high temperature detectable by the device, and wherein the device range bar is displayed within a device range bar area, an image range bar having a color gradient corresponding to a subrange of the temperatures, an indicator of the subrange of temperatures represented by the image range bar within the device range bar area, and an image display area for displaying a thermal image on the portable imaging device using colors from the color gradient that correspond to a temperature gradient for an image scene.

In another embodiment, the graphical user interface for a portable imaging device can include a shape representing a range of temperatures detectable by the device, a color gradient corresponding to a subrange of the temperatures, on the shape representing a range of temperatures, a graphical indication of the subrange of temperatures represented by the color gradient, and an image display area for displaying a thermal image on the device using colors from the color gradient that correspond to a temperature gradient for an image scene.

BRIEF DESCRIPTION OF THE DRAWINGS

FIGS. **1**A-C illustrate exemplary features of an imager.

FIG. **2** illustrates an exemplary graphical interface for display on a portable imager.

FIG. **3** illustrates an exemplary graphical interface for displaying key labels.

FIGS. **4**A-C illustrate an exemplary graphical interface for displaying range bars.

FIG. **5** illustrates an exemplary graphical interface for displaying range bars.

FIG. **6** illustrates an exemplary graphical interface for selecting a level or span.

FIG. **7** illustrates an exemplary graphical interface for adjusting a level parameter.

FIG. **8** illustrates an exemplary graphical interface for adjusting a level parameter

FIG. **9** illustrates an exemplary graphical interface for adjusting a span parameter.

FIG. **10** illustrates an exemplary graphical interface for adjusting a span parameter.

FIG. **11** illustrates an exemplary graphical interface for selecting an operating mode.

FIG. **12** illustrates an exemplary graphical interface for selecting a high or low alarm.

FIG. **13** illustrates an exemplary graphical interface for adjusting an alarm limit.

DETAILED DESCRIPTION

Interface Overview

The graphical user interface described herein can be used on a thermographic imager such as the one illustrated in FIGS. **1**A-C. With reference to FIG. **1**A, the imager can include a focus control **100**, an optical channel **101**, a laser aperture **102**, and a trigger **103**. With reference to FIG. **1**B, the imager can also include a USB port **105** and an AC adapter terminal **106**. With reference to FIG. **1**C, the imager can include a display **107**, one or more soft keys **108-110**, a battery compartment **111**, a threaded tripod mount **112**, and a wrist strap **113**. Variations are possible and an imager need not include all of these elements.

FIG. **2** illustrates an exemplary user interface to be displayed on a portable imager. The interface can include a status area **201**, an image area **202**, a range bar area **203**, a data area **204**, and a soft key label area **205**. As non-limiting examples, status area **201** can display information such as date **210**, time **211**, and battery level **212**. Status area **201** can also display a label **213** or icon indicating manual or automatic configuration of display parameters. In the example illustrated in FIG. **2**, the display of the "MAN" label **213** indicates that the display parameters have been manually configured. Image area **202** can be configured to display thermographic image data in a range of available colors. Image area **202** can include a cursor **206** for identifying a certain portion of the image for which a numeric temperature can be displayed. Data area **204** can display information such as image sequence number **215**, temperature **216** at the cursor **206**, emissivity **217**, and other information in message area **220**. In the example illustrated in FIG. **2**, alarm information is displayed in message area **220**. As described below in further detail, range bar area **203** can display thermal data from the imaged scene relative to the range of temperatures detectable by the imager.

Key label area **205** can display graphical or textual soft key labels associated with the soft keys **108-110** illustrated in FIG. **1**. The interface on the imager can be configured so that the functions implemented by the soft keys **108-110** are context specific and can be used for different purposes at different times. With reference to FIG. **3**, several key labels **301-303** can be displayed in label area **205**. For example, "ALARM" soft key label **301** can correspond to soft key **108**, "MENU" soft key label **302** can correspond to soft key **109**, and "SLEEP" soft key label **303** can correspond to soft key **110**. Pressing any soft key can invoke the function shown above the key on the display. In the exemplary embodiments illustrated in FIGS. **2** and **3**, three keys and labels are shown. One of ordinary skill in the art would recognize that more or fewer keys could be present on an imager.

Temperature Mapping

Currently available thermographic imaging equipment is capable of detecting a finite range of temperatures. For example, a device may be capable of detecting temperatures in the range of 14° F. to 662° F. Some devices may be able to resolve temperatures as low as 0.1° F. As a result, such a device could be capable of detecting over five thousand unique temperatures. However, it may not be practical to map on the imager display every detectable temperature to a unique color. First, the display on the imager may not be able to display thousands of colors. For example, some displays may only be capable of displaying 256 colors. Second, a mapping of the entire detectable temperature range to the visible light spectrum would result in typical scenes being represented in one narrow band of color on the display. Most of the colors would be unused because they would be mapped to extreme temperatures not present in the scene. For example, all temperatures from 9° F. to 212° F. might be represented by various shades of green.

Several systems and methods for mapping detected temperatures to visible light colors and adjusting that mapping are described below.

As illustrated in FIG. **4**A, the range bar area **203** can be configured to display information about the thermographic device as well as the scene being imaged. Range bar area **203** can be divided into several components including a device component **402** and an image component **403**. As illustrated in FIG. **4**C, range bar area **203** can include temperature bounds **411** and **412**. The temperature bounds **411** and **412** correlate the device component **402** to the image component **403**.

The device component **402** of range bar area **403** can be configured to display a device range bar **410**. The device range bar **410** can be displayed as a line having an origin and a destination, the origin corresponding to lowest temperature **405** detectable by the imager and at the destination corresponding to the highest temperature **406** detectable by the imager. In the example illustrated in FIGS. **4**A-C, the lowest detectable temperature is 14° F. and the highest detectable temperature is 662° F. In some embodiments, temperatures approximating the highest and lowest temperatures can be displayed instead of or addition to the highest and lowest detectable temperatures.

As illustrated in FIG. **4**C, a temperature cursor **407** also can be displayed on the device range bar **410**. The position of temperature cursor **407** indicates the temperature sensed in the area covered by the display cursor **206** in the context of the full range of detectable temperatures. In some embodiments, temperatures **405** and **406** are not displayed on the screen numerically. While range bar **410** is illustrated in FIG. **4**C as a horizontal line with an origin and a destination, one of ordinary skill in the art would recognize that other graphical representations of the temperature range could be used. As discussed in more detail below, icons indicating a low temperature alarm **408** and a high temperature alarm **409** also can be included on or near the range bar **410**.

As illustrated in FIG. **4**B, the image component **403** of range bar area **203** can be configured to display an image range bar **425** including colors representing the visible light spectrum. In the example illustrated in FIG. **4**B, the spectrum runs from black to white and includes a range of colors in between. In some embodiments, the color spectrum is not displayed. Additionally or alternatively, in some embodiments, the image range bar **425** can be displayed as a line having an origin and a destination, the origin corresponding to black or any other temperature that is understood to represent the lowest temperature in an image and a destination corresponding to white or any other temperature that is understood to represent the highest temperature in an image.

The temperature bounds **411** and **412** graphically link the device component **402** and image component **403**. As illustrated in FIGS. **4**A-C, the temperature bounds include a lower temperature bound **411** and an upper temperature bound **412**. Bounds **411** and **412** correspond to temperature points on the device range bar **410** in the device component **402**. The lower bound **411** and upper bound **412** define a partial temperature range 510 within the full range of the lowest temperature (14° F.) and the highest temperature (662° F.) detectable by the device.

The temperature of the lower bound and upper bound can be displayed. As illustrated in FIGS. **4**C and **5**, the image component **403** can display the temperature **413** at the lower bound **411** and the temperature **414** at the upper bound **412**. In the example illustrated in FIG. **5**, the temperature of lower bound **411** is displayed **413** as 77° F. and the temperature of upper bound **412** is displayed **414** as 146° F.

Bounds **411** and **412** also correspond to points on the image range bar **425**. In the example illustrated in FIG. **4**C, bound **411** corresponds to black and bound **412** corresponds to white. The bounds **411** and **412** thereby map the partial temperature range 510 on the device range bar to a color gradient. As a result of the location of the bounds **411** and **412** on device range bar **410**, only a certain range of temperatures will be mapped to the color spectrum. For example, a temperature such as 32° F. may be mapped to black and a temperature such as 212° F. may be mapped to white. Temperatures outside of that range would be handled as exceptions.

An interface can be provided so that a user can adjust the bounds **411** and **412** individually or together along device range bar **410**. In some embodiments, one of the bounds can be moved individually to thereby increase or decrease the distance between the two bounds. In some embodiments, both of the bounds can be moved, in opposite directions, along device range bar **410** to thereby increase or decrease the distance between the two bounds. This is referred to as adjusting the span between the bounds. Moving the two bounds together, in the same direction, keeps the distance between the two bounds the same while shifting the pair along the device range bar **410**. This is referred to as adjusting the level of the bounds.

Level Adjustment and Display

To adjust the level, a user can actuate the soft key that corresponds to level option **601** illustrated in FIG. **6**. Once the level option has been activated, level controls can be displayed as illustrated in FIG. **7**. The level controls can include upward control **701** and downward control **702** for shifting the bounds along device range bar **410**. FIG. **7** illustrates the bounds **411** and **412** having been shifted to the right (upward) on device range bar **410** with respect to their position in FIG. **6**. FIG. **8** illustrates the bounds **411** and **412** shifted to the left (downward) on device range bar **410** with respect to their position in FIG. **6**.

In FIGS. **6**, **7**, and **8**, the level has been set at different positions along device range bar **410**. In FIG. **7**, the temperature cursor **407** is at 136.9° F. The lower bound is 411 is set at 186° F. and the upper bound **412** is set at 254° F. Temperature display **216** indicates that the cursor temperature **407** is 136.9° F. Because no portion of the image reached at least 186 degrees, the displayed image is black. In this example, the bounds have been configured to map the color spectrum to a range of temperatures that is higher than any object being imaged. No useful thermographic image can be displayed.

In FIG. **8**, temperature display **216** indicates that the temperature cursor **407** is at 137.2° F. The lower bound **411** is set at 36° F. and the upper bound **412** is set at 104° F. In this example, the bounds have been configured to map the color spectrum to a range of temperatures that is mostly lower than most of the object being imaged. While a thermographic image is discernible in FIG. **8**, most of the image is mapped to white.

In FIG. **6**, temperature display **216** indicates that the temperature cursor **407** is at 133.3° F. The lower bound **411** is set at 77° F. and the upper bound **412** is set at 146° F. The temperature cursor **407** is well within the upper and lower bounds and the image displayed provides more useful thermographic information than the settings used in FIGS. **7** and **8**. Thus, the level can be configured so that the visible color spectrum is mapped to a practically useful or optimal range of temperatures present in the scene being imaged.

Span Adjustment and Display

As discussed above, an exemplary imager may be able to detect temperatures between 14° F. to 662° F. (−10° C. to 350° C.) and display a corresponding image on an LCD display capable of displaying about 256 shades of color. By adjusting the temperature span, a user can see more subtle temperature gradients in a captured image. For example, if an image with a temperatures ranging from 70° F. to 90° F. is reviewed using a wide temperature span, the approximately 200 detectable temperatures in the image will be concentrated into only about 15 of the 256 shades that could be shown. Reducing the temperature span to 20° F., from 70° F. to 90° F., allows the user to view the imaged scene with the full range of about 256 shades of color.

To adjust the span, a user can actuate the soft key that corresponds to the span option **602** illustrated in FIG. **6**. Once the span option has been activated, span controls can be displayed as illustrated in FIG. **9**. The span controls can include narrowing control **901** for decreasing the span and widening control **902** for increasing the span between bound **411** and **412** on device range bar **410**. FIG. **9** illustrates the span **510** having been increased with respect to the span **510** in FIG. **6**. While the span illustrated in FIG. **6** covers 77° F. to 146° F., the span **510** between low bound **413** and high bound **414** illustrated in FIG. **9** covers 98° F. to 2580F, about twice the range of the span **510** in FIG. **6**. In FIG. **10**, the span **510** has been decreased with respect to the span **510** in FIG. **6**. While the span **510** illustrated in FIG. **6** covers 77° F. to 146° F., the span **510** between low bound **413** and high bound **414** illustrated in FIG. **10** covers about 40° F., about half the range of the span **510** in FIG. **6**.

In FIG. **9**, the available color spectrum is mapped to the range of 98° F. to 258° F., about 160° F. In FIG. **10**, the available color spectrum is mapped to the range of 101° F. to 141° F., about 40° F. Both figures illustrate the display thermographic images of the same object. In FIG. **9**, the color spectrum is mapped to a larger temperature span and, as a result, fewer colors are available for the particular temperature range of the object being imaged. In FIG. **10**, the color spectrum is mapped to a narrower temperature span that more closely matches the temperatures of the object. Thus, more colors are available for the particular temperature range of the object being imaged when the span is selected appropriately.

Modes

In some embodiments, the span and level parameters can be adjusted manually or automatically. In manual mode, a user can define level and span values manually. In manual mode, the user can fine tune the low bound **411** and high bound **412** values to the desired cut-off levels and configure a temperature span and range to improve color resolution.

In some further embodiments, an interface can be provided for switching between manual and automatic modes. As illustrated in FIG. **11**, soft key labels can be displayed for configuring these parameters automatically by selecting the "AUTO" mode **1101** or manually by selecting the "MANUAL" mode **1102**. In manual mode, display parameters including the level and span parameters can be set by a user as described above. In automatic mode, the parameters can be automatically set by the device based on the detected scene. In automatic mode, the device can automatically set the low bound **411** at or near the lowest temperature detected in the entire scene and the high bound **413** at or near the highest temperature detected in the scene. Some embodiments can include a semi-automatic mode in which the user can select the span and the level is configured automatically or the user can select the level and the span is configured automatically.

Alarms

Using the interface illustrated in FIG. **3**, a button label **301** for setting one or more temperature alarms can be displayed. With reference to FIG. **4C**, the alarms can include a low temperature alarm represented by low alarm limit **408** and a high temperature alarm represented by high alarm limit **409**.

Selection of the "ALARM" soft key can cause display of the buttons illustrated in FIG. **12**. The user can set a high alarm and a low alarm using the corresponding soft keys **1201** and **1202**. A soft key label "DONE" **1203** can also be provided. An exemplary interface for setting the low alarm is illustrated in FIG. **13**. The user can use the soft keys corresponding to the down arrow **1301** and the up arrow **1302** to adjust the position of the low alarm limit **408**. The interface can be configured to display the temperature **1303** corresponding to the position of the low alarm limit **408**. A similar interface can be provided for adjustment of the high alarm limit **409**.

The temperature information **1303** and other information in the data area **204** can be displayed in one or more different colors as appropriate. For example, when an alarm limit is adjusted, the lower alarm limit can appear in blue text in the data area **204** and upper alarm limit can appear in red text in the data area **204**. The low alarm indicators and high alarm indicators **408** and **409** can also move on device range bar **410** as the alarm values are adjusted. Some embodiments can include a default low alarm limit (for example, 14° F.) and a default high alarm limit (for example, 662° F.). When a user is done adjusting the tags, the user can press the soft key corresponding to the "DONE" option **1305**.

In some embodiments, if the temperature at temperature cursor **407** exceeds either of these alarm limits, an alarm notification can be generated. As non-limiting examples, the alarm notification can include a sound, a graphic image, a vibration, or any other sensory experience. In some embodiments, the exceeded alarm limit can flash on the display screen. In some embodiments, the notification can include a blinking alarm indicator on the display and/or the center image can blink and the displayed temperature **216** can turn bold blue and/or start alternating or flashing between bold blue and black. Other colors could be used depending on which limit has been exceeded and one or more preferences defined by a user.

Routing Applications

To improve the usability of imagers, some portable imagers can be programmed to store a predefined route and then prompt the user to proceed to the predefined stops along the route.

Some known systems provide a base computer at which a user can define a route that subsequently can be transferred to a portable imaging system. A route, as the term is used herein, is a predefined set of physical locations to be inspected. Typically, a user would record thermal images from a number of locations along a route. These images would be stored on the portable device until they are downloaded to the base computer at the completion of the inspection route.

The imager can store parameters associated with locations on a route and parameters associated with individual images. In some embodiments, some or all of the span, level, and alarm parameter settings for one or more inspection locations can be stored on a handheld imager and can be associated on the handheld with the corresponding locations. The first time a user images an inspection location, the device can store parameters indicating whether the location is to be imaged using an automatic or manual configuration, as well span, level and alarm parameter settings specific to that location. When a user returns to a given route location, the appropriate span, level and alarm parameter settings can be loaded and applied to the display in the portable imager. The imager can also store other parameters associated with a location. As non-limiting examples, other parameters can include location name, comment, emissivity, ambient temperature compensation value, low alarm, and high alarm.

Different locations on a route could be associated with different values for the parameters sets. For example, when a user is at inspection Location A, a lower bound of 62° F. and an upper bound of 222° F. might be recalled along with a high alarm limit of 200° F. The display could be configured accordingly. At Location B, a lower bound of 100° F. and an upper bound of 315° F. might be recalled along with a high alarm limit of 300° F.

In some embodiments, certain parameters can be stored in connection with a recorded image independently of its location on a route. As non-limiting examples, these parameters can include location name, comment, emissivity, ambient temperature compensation value, low alarm, high alarm, image time, color palette, target temperature, internal temperature, minimum temperature, and maximum temperature.

In some embodiments, various parameters that are stored on the handheld and associated with inspection locations and/or recorded images can be transferred to a base computer. For example, the span, level and alarm settings can be transferred to a base computer. Once on the base computer, the span, level and alarm parameters can maintain their association with the image. In some embodiments, recorded images and locations can be displayed based on the associated parameters and the parameters can be displayed with the image at the base computer. For example, an alarm parameter set by a user on the handheld device can be applied to the corresponding image on the base computer and the base computer can present the alarm.

In some embodiments, one or more of the span, level and alarm parameters can be input by a user at the base computer so that the parameters are associated with one or more inspection locations. These parameters can then be transferred to the handheld so that when the user is at a certain inspection location with the handheld, the associated parameters can be applied at the imager automatically. For example, an alarm set at the base computer can be generated on the handheld when the user is at a predetermined inspection location.

One of skill in the art would appreciate that while the interface is described with reference to display labels which correspond to soft keys, the interface could also be implemented using a touch screen or any other device that receives input from a user in response to a visual, audible, or tactile prompt.

Many specific details of certain embodiments of the invention are set forth in the description and in FIGS. **1-13** to provide a thorough understanding of these embodiments. A person skilled in the art, however, will understand that the invention may be practiced without several of these details or additional details can be added to the invention. Well-known structures and functions have not been shown or described in detail to avoid unnecessarily obscuring the description of the embodiments of the invention.

From the foregoing, it will be appreciated that specific embodiments of the invention have been described herein for purposes of illustration, but that various modifications may be made without deviating from the invention. Aspects of the invention described in the context of particular embodiments may be combined or eliminated in other embodiments. Further, while advantages associated with certain embodiments of the invention have been described in the context of those embodiments, other embodiments may also exhibit such advantages, and not all embodiments need necessarily exhibit such advantages to fall within the scope of the invention.

We claim:

1. A method for configuring a display on an imaging device, comprising:

displaying a device range bar indicating a range of temperatures, wherein one end of the range bar corresponds to a low temperature detectable by the device and an other end corresponds to a high temperature detectable by the device, and wherein the device range bar is displayed within a device range bar area;

displaying an image range bar having a color gradient corresponding to a subrange of the temperatures within the range of temperatures displayed on the device range bar, wherein the device range bar includes a visual indication of end points corresponding to a lower bound temperature and an upper bound temperature of the subrange of temperatures;

in response to a user input selection to adjust bounds of the subrange of the temperatures, selectively either (i) adjusting a span between upper and lower bounds of the subrange of temperatures or (ii) linking the upper and lower bounds such that a single span user input shifts the upper and lower bounds together as a pair to keep a same distance between the upper and lower bounds, and changing the color gradient so as to correspond to the adjusted or shifted bounds of the subrange of the temperatures; and

providing at least one alarm limit symbol indicating an alarm limit temperature in the device range bar area, wherein the alarm limit temperature corresponds to at least one of (i) a low alarm temperature greater than a lowest detectable temperature by the device and less than the lower bound temperature of the subrange or (ii) a high alarm temperature greater than the upper bound temperature of the subrange and less than a highest detectable temperature by the device,

wherein an alarm notification is based on the at least one of the low alarm temperature and the high alarm temperature,

wherein the device range bar includes the at least one alarm limit symbol,

wherein a thermal image displayed on the imaging device uses colors from the changed color gradient that correspond to a temperature gradient for an image scene,

wherein the device range bar includes a temperature indicator cursor, and

wherein a position of the temperature indicator cursor on the device range bar indicates a temperature sensed for an area corresponding to a display cursor in the thermal image.

2. The method of claim **1**, further comprising displaying a numerical indication of the lower bound temperature of the subrange at one end of the image range bar and displaying a numerical indication of the upper bound temperature of the subrange at another end of the image range bar.

3. The method of claim **1**, further comprising:

receiving a temperature input from a user; and

providing a perceptible indication of an alarm when a detected temperature is higher than or lower than the received temperature.

4. The method of claim **1**, further comprising providing an interface whereby a user can configure the device to manually or automatically configure the subrange of temperatures.

5. The method of claim **1**, further comprising:

associating the subrange of temperatures or an alarm temperature with a displayed thermal image on the imaging device; and

transmitting the subrange of temperatures or the alarm temperature to a base computer.

6. The method of claim **1**, further comprising:

receiving the subrange of temperatures or an alarm temperature input at a base computer;

associating the subrange of temperatures or the alarm temperature with an inspection location; and

transmitting the subrange of temperatures or the alarm temperature to the device for application on the device at the associated inspection location.

7. The method of claim **1**, wherein the low temperature detectable by the device is the lowest temperature detectable by the device.

8. The method of claim **1**, wherein the user input selection comprises toggling between adjusting the span between the upper and lower bounds and shifting the upper and lower bounds as a pair.

9. The method of claim **1**, wherein adjusting the span between the upper and lower bounds of the subrange of temperatures comprises moving the upper and lower bounds in opposite directions to one another along the device range bar to either increase or decrease the distance between the upper and lower bounds.

10. The method of claim **9**, wherein moving the bounds in opposite directions along the device range bar to either increase or decrease the distance between the two bounds is performed in response to a single user input.

11. A graphical user interface stored on a non-transitory computer readable medium for an imaging device, comprising:

a device range bar indicating a range of temperatures, wherein one end of the range bar corresponds to a low temperature detectable by the device and an other end corresponds to a high temperature detectable by the device;

an image range bar having a color gradient corresponding to a subrange of the temperatures within the range of temperatures displayed on the device range bar;

a visual indication on the device range bar of end points corresponding to a lower bound temperature and an upper bound temperature of the subrange of temperatures;

a first user interface configured to accept a first user input for determining whether to link an upper bound and a lower bound of the subrange of temperatures together;

a second user interface configured to accept a second user input to (i) adjust a span between the upper and lower bounds of the subrange of temperatures or (ii) shift the upper and lower bounds together as a pair to keep a same distance between the upper and lower bounds, and changing the color gradient so as to correspond to the adjusted or shifted bounds of the subrange of the temperatures; and

an image display area for displaying a thermal image on the imaging device using colors from the changed color gradient that correspond to a temperature gradient for an image scene,

wherein the device range bar includes a temperature indicator cursor, and wherein a position of the temperature indicator cursor on the device range bar indicates a temperature sensed for an area corresponding to a display cursor on the thermal image,

wherein the device range bar further includes at least one alarm limit symbol indicating an alarm limit temperature on the device range bar,

wherein the alarm limit temperature corresponds to at least one of (i) a low alarm temperature greater than a lowest detectable temperature by the device and less than the lower bound temperature of the subrange or (ii) a high alarm temperature greater than the upper bound temperature of the subrange and less than a highest detectable temperature by the device, and

wherein the device range bar includes an alarm notification based on the at least one of the low alarm temperature and the high alarm temperature.

12. The user interface of claim **11**, further comprising a display of a numerical indication of the lower bound temperature of the subrange at one end of the image range bar and a display of a numerical indication of the upper bound temperature of the subrange at another end of the image range bar.

13. The user interface of claim **11**, further comprising an input for receiving a user input to increase or decrease the span of temperatures comprising the subrange.

14. The user interface of claim **11**, further comprising an input for receiving a user input to shift the subrange of temperatures to represent a higher or lower subrange of temperatures.

15. The user interface of claim **11**, further comprising:

an input for receiving a temperature input from a user; and a perceptible indication of an alarm when a detected temperature is higher than or lower than the received temperature.

16. The user interface of claim **11**, further an comprising interface whereby a user can configure the device to manually or automatically configure the subrange of temperatures.

17. The user interface of claim **11**, further comprising an interface for:

associating the subrange of temperatures or an alarm temperature with a displayed thermal image on the imaging device; and

transmitting the subrange of temperatures or the alarm temperature to a base computer.

18. The user interface of claim **11**, further comprising an interface for:

receiving the subrange of temperatures or an alarm temperature input at a base computer;

associating the subrange of temperatures or the alarm temperature with an inspection location; and

transmitting the subrange of temperatures or the alarm temperature to the device for application on the device at the associated inspection location.

19. The user interface of claim **11**, further comprising a key for selecting between adjusting the span between the upper and lower bounds and shifting the upper and lower bounds as a pair.

20. The user interface of claim **11**, wherein adjusting the span between the upper and lower bounds of the subrange of temperatures comprises moving the upper and lower bounds in opposite directions to one another along the device range bar to either increase or decrease the distance between the upper and lower bounds.

21. The user interface of claim **20**, wherein moving the bounds in opposite directions along the device range bar to either increase or decrease the distance between the two bounds is performed in response to a single user input.

22. A graphical user interface stored on a non-transitory computer readable medium for an imaging device, comprising:

a shape representing a range of temperatures detectable by the device, the range of temperatures detectable by the device extends between and includes a lowest detectable temperature and a highest detectable temperature by the device;

a color gradient corresponding to a subrange of the temperatures, the subrange of temperatures extends between and includes a lower bound temperature and an upper bound temperature;

at least one alarm limit symbol indicating an alarm limit temperature on the shape, wherein the alarm limit temperature corresponds to at least one of (i) a low alarm temperature greater than the lowest detectable temperature and less than the lower bound temperature of the subrange, and (ii) a high alarm temperature greater than the upper bound temperature of the subrange and less than the highest detectable temperature, wherein an alarm notification is generated based on the at least one of the low alarm temperature and the high alarm temperature; and

an image display area for displaying a thermal image on the device using colors from the color gradient that correspond to a temperature gradient for an image scene,

wherein the shape includes the at least one alarm limit symbol, an upper bound temperature symbol indicating the upper bound temperature, and a lower bound temperature symbol indicating the lower bound temperature, and

wherein the at least one alarm limit symbol, the lower bound temperature, and the upper bound temperature are adjustable in response to a user input.

23. The graphical user interface of claim **20**, wherein the image display area displays the alarm notification.

24. The graphical user interface of claim **22**, wherein in response to a user input selection to adjust bounds of the subrange of the temperatures, a span between the upper bound temperature and the lower bound temperature of the subrange of temperatures is adjusted and the color gradient is changed so as to correspond to the adjusted bounds of the subrange of the temperatures.

25. The graphical user interface of claim **22**, wherein in response to a user input selection to adjust bounds of the subrange of the temperatures, the upper bound temperature and the lower bound temperature are linked such that a single span user input shifts the bounds together as a pair to keep a same distance between the bounds, and the color gradient is changed so as to correspond to the shifted bounds of the subrange of the temperatures.

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